

## **Clusters and series consonants of the kaur language (Phonological analysis)**

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**Abstract** - The phonotactic system is one of the interesting phonological systems to explain because it is the system that regulates the existence, abilities, and inability of phoneme combinations of a language. To that end, this article describes the Kaur language phonotactic system which includes (1) the cluster phonotactic system and (2) the consonant series phonotactic system. The data in this study were sourced from six key informants who were domiciled in Kaur Regency (Bengkulu Province) with the criteria of being between 50--65 years old, native Kaur tribe, never left their native area, mastered Kaur language and culture well, and communicative. Data was collected through interviews and recording devices. Data were analyzed to determine the cluster and consonant series with the help of a speech analyzer. The results showed that in Kaur language (KL) there are 14 clusters (/pl/, /bl/, /gl/, /mp/, /mb/, /nt/, /nd/, /st/, /ɲc/, /ɲj/, /ɲcl/, /ɲk/, /ɲg/, /ɲgl/) and 21 series: /mp, mb, nt, nd, ns, ɲc, ɲj, ɲk, ɲg, ɲs, ʃb, ʃt, ʃd, ʃc, ʃk, ʃs, sk, st, ʔm, ʔ-ʃ, ʔ-mp/. In KL there is a unique consonant vowel sequence (homorgan consonant series). There are three rules if-then to explain the cluster of KL and five rules if-then to explain the series of KL consonants. KL has a unique phonotactic system so that this study contributes to the development of KL.

**Keywords:** phonotactic; cluster; consonant series; if-then rule

## 1. Introduction

This study discusses the cluster phonotactic system and the consonant series of Kaur language (KL). Geographically and genetically also, KL is adjacent to Serawai language, Pasemah language, and also other languages (Hadi, 2011; Hadi et al., 2013). KL, Serawai language, and Pasemah language are located in Kaur Regency and South Bengkulu Regency and include the Central Malay language family and are used for various purposes (Hadi, 2012). KL has its own phoneme combination system or specific phonotactic system. This phonotactic system is important to describe and analyze to get an idea of how phonemes combine (Zydorowicz & Orzechowska, 2017). The combination of these phonemes becomes one of the uniqueness that needs to be explained in order to obtain a more adequate description. The combination of phonemes in this phonotactic system focuses on three aspects, namely (1) the existence of phonemes, (2) the possibility of phonemes combining with other phonemes, and (3) the impossibility of phonemes combining with other phonemes (Bybee, 2003). Based on its existence, for example, in many variations of the English language, if an inhibitory consonant appears in the first position of a complex onset, the second consonant that can appear following it is the approximate sound /r, l, w, j/ (e.g. tray, play, twice, and cure). It is in stark contrast to the French phonotactics that inhibitory sounds can be followed by consonants /n/ and /s/, for example pneu [pno] ‘tire’ and psychiatre [psychjatr] ‘psychiatrist’ (Carr, 2008). Thus, if the existence of the English inhibitory sound occupies the first position on the complex onset, it can be predicted that the possibility of sounds combining with it is the sound of approximation and vice versa, can also be predicted sounds that are impossible to combine with it. To that end, the combination /bn/ is something that is impossible to happen in English, whereas the combination /bl/ is something that is possible in this language (Carr, 2008).

In KL, it is found, for example, the phoneme /mp/ combination in the word mpuk [mpuʔ] ‘though’, /st/ in the word stum [stom], ‘car’, /ɲcl/ in the word nyclakik [ɲclakik>] ‘sit on high’. The combination is in the form of homorganic phonemes and has similarities with many languages in the world, such as Idi language (Schokkin et al., 2021) and Arsi-Bale Afan Oromo language (Negash, 2015). On the other hand, the combination of the phoneme /ʔ-ʕ/ on the sakre [saʔʕə] ‘very poor’ and /ʔ-mp/ on the pəkmpaŋan [pəʔmpaŋan] ‘crotch’ indicates the uniqueness of LK.

The above phenomenon shows that between one language and another language has a difference in terms of combining phonemes in forming a series of phonemes. Phoneme series that are not allowed in one language are not necessarily not allowed in another language and, on the other hand, phoneme series that are allowed in a particular language are not necessarily allowed in another language. Thus, it can be stated that this phoneme series can also describe one side of the uniqueness of a language.

It should be emphasized that phoneme combinations, both viewed based on their existence and the possibility to combine with other phonemes, or viewed based on the impossibility of combining with other phonemes following certain rules. The rules that define the sequence or tracing of phonemes that are allowed (and at the same time that are not allowed) in one language are called phonotactic rules.

Phonotactic principles are part of the abilities and knowledge possessed by speakers of a language. Furthermore, Yusuf in (Hadi, 2012) exemplifies that speakers of Indonesian, Sundanese, and English are unlikely to produce [fprog] ‘value, good’ strand of Russian sound. This is because the fusion of sounds [fpr] is not part of the phonological system of the three languages. Speakers of Indonesian and English will pronounce [pefrog], while Sundanese will pronounce [feperog] or even [peperog], according to the sound system and phonotactics of their respective languages. In fact, for Russian speakers, the combination of sounds is common, because that's how the phonotactic system is. Russian speakers also easily pronounce other “difficult” sounds, such as [ps] in the word [psa] ‘his dog’, [fsl] in the word [fslux] ‘loud, loud’, and [pt] in the word [ptitsa] ‘bird’.

In Kaur language, the range of allowed sounds, other than those that are common or usual— the network between vowels and consonants or between consonants and vowels-, also includes consonant clusters, consonant sequences (consonant sequences), diphthongs, and vowel sequences. These four sets of sounds are what are discussed in this part of the Kaur language phonotactic system.

Consonant clusters are two or more consonants pronounced in a single time. Thus, the consonant occurs in one structure because it occupies only the onset position in a syllable. When in a word there

are two consonants in sequence, which seem to be a cluster of consonants, but after being separated into the tribes it turns out that the consonants in sequence are in different tribes. Consonants that are sequential are not said to be consonant clusters, but are said to be consonant series. Furthermore, diphthong is a language sound that at the time of pronunciation is characterized by changes in tongue motion and one-time tanber changes, and which serves as the syllable core, such as /ai/ in the word *lambai* [lambaɪ] ‘wave’. If there are two or more consecutive vowels in a word, but each vowel has a different loudness peak because it occupies a different tribe, such vowels are not called diphthongs, but are called rows of vowels.

## 2. Method

### 2.1 Research design

This study used a qualitative research method involving six informants as a source of data. This research data is in the form of speech in which there are clusters and consonant series obtained through the listening technique. The collected speech and consonant series are analyzed to find out the sound segments and ascertain whether the words are clusters, consonant series, or others. To get certainty of the data, a speech analyzer version 3.0.1 is used. The data that has been analyzed is also used (if-then) to obtain a combination system of clusters and KL consonant series. The data is presented formally and informally.

### 2.2 Participants

This research data was obtained from six informants as native speakers of KL. The six informants were aged between 50--65 years and were domiciled in Kaur Regency. The informant has a normal speech, is physically and spiritually healthy, well versed in the Kaur language and culture, never leaves the Kaur region, honest, open, patient, and friendly.

### 2.3 Data Collection

This study uses researchers as an instrument equipped with interview guidelines and recording tools. Interviews are open using KL (researchers are assisted by two assistants who are Kaur and master the Kaur language and culture well). The speech delivered by the informant is recorded which is then transcribed using phonetic spelling. From the transcription of speech can be seen words that belong to consonant clusters and consonant series. Then, the data is traced to a number of other informants.

### 2.4 Data Analysis

The collected data was analyzed using a speech analyzer version 3.0.1 to confirm that the words belonged to a cluster or series of consonants. Clusters and consonant series were analyzed by taking into account the presence of sound, both from the aspect of the place of articulation, the way of articulation, organics, insertion, dissipation, and separation of the syllables occupied by the sound. The sounds are also analyzed based on their uniqueness in the form of distinctive features and combinations with other sounds. Finally, the cluster and series of consonants are described in the rule if-then to see the abilities and inability of the sounds are combined.

## 3. Results and Discussion

### 3.1 Realization of KL Consonant Cluster

There are 14 pieces of KL consonant clusters: /pl/, /bl/, /gl/, /mp/, /mb/, /nt/, /nd/, /st/, /ɲc/, /ɲj/, /ɲcl/, /ɲk/, /ɲg/, dan /ɲgl/. The first consonants of KL cluster builders are inhibitory consonants (/p, b, g/), fricatives (/s/), and nasals (/m, n, ɲ, ŋ/). The second consonant of the KL cluster builder is a lateral consonant (/l/) and inhibit (/p, b, t, d, c, ʃ, k, g/). The third consonant of the KL cluster builder is the lateral consonant/l/. This cluster of three consonants is quite unique because the first and second consonants are homorganic. In Indonesian there are also clusters like this, as in the words *struktur*, *sprei*, *skripsi*, and *sclerosis* (Moeliono et al, 2017). This consonant /l/ is quite unique because in other languages it is rarely found, for example in Indonesian. In Swedish it is more unique, as in the word /smaragd/ (Raza, 2020). Related to this third consonant, KL is quite unique because in other languages it is rarely found. This KL cluster is quite varied when compared to other languages, such as the Javanese environment of rice fields (Milu Susetyo et al., 2021) and the Gurom language (Rumalean et al., 2018). Here are the KL consonant clusters.

Table 1 Consonant Cluster KL

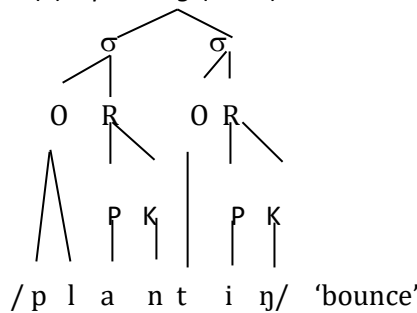
Cluster	Cons. 1	Cons. 2	Cons. 3	Sample Data
Lateral-inhibition	/p/			[plantɪŋ] ‘bounce’
	/b/	/l/		[bləbuʔ] ‘allergic bumps’
	/g/			[glasə] ‘tent’
Fricative-inhibition	/s/	/t/		[stom], ‘car’
	/m/	/p, b/		[mpuʔ] ‘although’
	/n/	/t, d/		[mbə] ‘impossible’ [ntaŋ] ‘around’ [ndaŋ] ‘don’t’
Nasal-inhibition (lateral)	/ŋ/	/c, ɟ/	/l/	[ŋcəkau] ‘pick’ [ŋɔʔ] ‘give’ [ŋclakik <sup>&gt;</sup> ] ‘sitting on high’
	/ŋ/	/k, g/	/l/	[ŋkin] ‘so’ [ŋgup] ‘don’t want to’ [ŋglahu] ‘very spicy’

Cons.\* = consonant

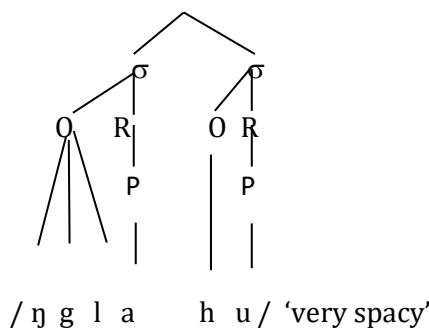
Table 1 above shows that in forming clusters (1) bilabial/velar inhibitory consonants in combination with lateral consonants /l/, (2) alveolar fricative consonants in combination with homorganic alveolar /t/ inhibitory consonants, and (3) all nasal consonants in combination with homorganic inhibitory consonants. Specifically in the cluster of three consonants, the third consonant is the lateral consonant/l/.

All KL clusters occupy a position of onset (complex onset) that occupies the beginning of the word, except for the word pekmpangan /pəʔmpaŋan/ [pəʔmpaŋan] ‘groin’. This is in contrast to English and Hebrew which have complex codas, for example in the words /dʒʌmp/ ‘jump’ (Olarewaju & Sunday, 2020) and /ja.ʃávʔ/ ‘you.fm sat’ (Asherov & Bat-El, 2019). The following is an example of the existence of KL clusters in a syllable diagram.

(a) *planting* (word)



(b) *ngglahu* (word)



Diagrams (a) and (b) show that the cluster occupies a separate onset property with rhyme. Although separate, the onset still pays attention to the series sonority and homogeneity in shaping the significance of the KL cluster structure. Nasal and inhibitory cluster structures should not be inserted schwa when realized phonetically (/ŋəglahu/ unacceptable). In addition, because of this homogeneity, the phonetic realization of the initial position consonant can be dissipated, as in the example.

ndang kangau /ndaŋ kaŋau/ [daŋ kaŋau] ‘do not you’  
 mpai beli /mpai bæli/ [pai bæli] ‘just bought’  
 nggup agi [ŋgup agi] [gup agi] ‘no more’

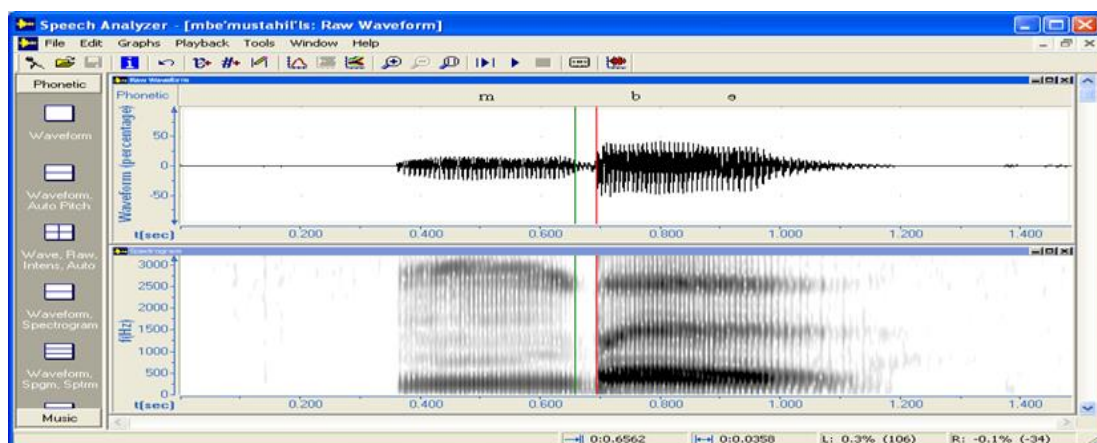
Apparently, the homogeneity between nasal and inhibitory is the determinant in determining the appearance of schwa. There is no phonetic realization of the appearance of schwa between the clusters so that the realizations [nədaŋ], [məpai], and [ŋəgup] are not acceptable.

Different phenomena occur in the /st/ cluster. Although the sounds in this cluster are homorganic, among these clusters can be inserted by schwa. The appearance of the schwa inserted between /s/ and /t/ is inseparable from the role of /s/ as a sound characterized by the [+continuum] --which of course contradicts the sound /t/ characterized by the [-continuum]. In addition to the /st/ clusters that schwa can insert, the lateral-inhibitory cluster can also be inserted by schwa when the cluster is realized in phonetic realization.

KL clusters, especially clusters built by a combination of nasal consonants and inhibitions are different from prenasal sounds, as reported by Suparsa (2009) in Rongga language /mb/, /nd/, and /ng/ and also in Muna language. Based on acoustic testing, these segments are not clusters. The test results showed that segment duration [b] was 111 milliseconds, segment duration [mb] was 99 milliseconds, and segment duration [m] was 118 seconds. The calculation concludes that /mb/ is not a consonant series /mb/, but a separate segment so that the elements cannot be separated because prenasal is a complex consonant that has one ‘spirit’. This is certainly different from clusters that can be separated from the elements.

Phonologically, the evidence that KL has a cluster of consonants (not prenasal) is (1) one of the cluster filler consonants can undergo a change in position—for example the consonant /m/ at /mp/ that acts as an onset (complex) can undergo a shift to the position of the coda in the previous quarter, as in data /agi + mpai/ [gim.pai] ‘is still new’; (2) one of the cluster filler consonants can undergo an abrasion, as in data /ndaɪ manə/ [dai mənə] ‘from where’; and (3) phonotactically, apart from having nasal-inhibitory clusters, KL also has nasal-inhibitory clusters.

In addition to phonological proof, phonetic proof through spectrograms reinforces the argument that KL has a consonant cluster, not a prenasal sound. This can be seen in Figure 1 below with mbe /mbə/ ‘impossible’ as an example of data.



Consonant Cluster Drawing /mb/ at mbe /mbə/ ‘impossible’

The figure above shows that between the /m/ segment and the /b/ segment is separated by a certain silence. The silence that separates these two segments is very short, which is 36 milliseconds. Although there is a continuous vibration in the image, there is a space between the /m/ and /b/ segments that separates these two segments. The slight appearance of vibrations between the two segments is due to the influence of nearby sounds.

Furthermore, it can also be observed that the space occupied by the /m/ and /b/ segments as sound segments contrasts with the space between them, namely the space in the /m/ and /b/ segments. Testing using spectrograms reinforces the argument that KL has clusters (e.g. /mb/), not pranasal sounds. In pranasal sound there is no space (slot) separator between one segment and another segment. This can be seen from the spectrogram presented by Suparsa (Suparsa, 2009) in analyzing the pranasal sound /mb/ with the example of mboti //mboti/ [mboti] ‘spinach’ data.

### 3.2 KL Consonant Series

There are 21 consonant series in KL: /mp, mb, nt, nd, ns, ꞑc, ꞑꞑ, ꞑk, ꞑg, ꞑs, ꞑb, ꞑt, ꞑd, ꞑc, ꞑk, ꞑs, sk, st, ꞑm, ꞑ-ꞑ, ꞑ-mp/. The KL consonant series is more complex when compared to the Ulu Muara Sipongi language or Toba Dialect Batak consonant series (Siagian & Prishandani, 2022) and Tunjung language or consonant series (Nur Bety et al., 2021). Each row of consonants is shown below.

Table 2 KL Consonant Series

Conc Series	Cons. 1	Cons. 2	Cons. 3	Sample Data
Fricative-inhibition	/ʔ/	/ʃ/		/saʔʃə/ ‘very poor’
Inhibition-Nasal-inhibition	/ʔ/	/m/	/p/	/pəʔmpaŋan/ ‘crotch’
Nasal-inhibition	/m/	/p, b/		/kampuʔ/ ‘baby’ /imbit/ ‘pregnant’
	/n/	/t, d/		/bontu/ ‘poor’ /tandap/ ‘machete’
	/ꞑ/	/c, ʒ/		/kaꞑcət/ ‘panties’ /kaꞑꞑi/ ‘flirty’
	/ꞑ/	/k, g/		/paꞑkə/ ‘season’ /tuꞑgə/ ‘interview’
	Nasal-fricative	/n/	/s/	
Fricative-inhibition	/ʃ/	/p, b, t, d, c, k/		/səʃpat/ ‘same’ /kəʃbau/ ‘səhifə’ /kəʃtas/ ‘paper’ /kəʃdus/ ‘cardboard’ /kəʃcis/ ‘səhifə’ /təʃkam/ ‘hidden’
	/s/	/t/		/məsti/ ‘must’
Fricative-nasal	/ʃ/	/m/		/kəʃmuk/ ‘bribe money’
Fricative-fricative	/ʃ/	/s/		/koʃsi/ ‘chair’

Table 2 above shows there are seven consonants that occupy the first row (/ʔ/, /m/, /n/, /ꞑ/, /ꞑ/, /s/, /ʃ/); eleven consonants that occupy the second row (/p/, /b/, /t/, /d/, /c/, /ʒ/, /k/, /g/, /s/, /ʃ/, /m/); and one consonant that occupies the third row (/p/). The first consonant that can be paired with the second consonant is /ʃ/, which is paired with the seven second consonants. Next, the consonants /n, ꞑ, s/ are each paired with three second consonants. Lastly, the /m/ /m/, /ꞑ/, dan /ʔ/ consonants are each paired with two second consonants. Specifically in the consonant /ʔ/, this consonant can be paired with the cluster /mp/ resulting in a row of three consonants, the first consonant is /ʔ/ followed by the second consonant (/m/) and the third consonant (/p/).

Furthermore, the sequence of KL consonants can be explained as follows. First, by means of articulation, the first consonant is dominated by a nasal consonant (/m/, /n/, /ꞑ/, /ꞑ/), then followed by



a fricative consonant (/ʃ, s/), then an inhibitory consonant (/ʔ/); the second consonant is dominated by an inhibitory consonant (/p, b, t, d, c, ɟ, g/), then a fricative consonant (/ʃ, s/), then a nasal consonant (/m/); and the third consonant is filled by an inhibitory consonant (/p/).

Second, based on the place of articulation, the first consonant is bilabial, alveolar, palatal, velar, pharyngeal, and glottal consonants; while the second consonant is bilabial, alveolar, palatal, velar, and pharyngeal; meanwhile, the third consonant is bilabial. Third, based on voicing, the first consonant is dominated by voiced consonants (/m/, /n/, /p/, /t/, /ʃ/); in the second consonant, voiced consonants (/b/, /d/, /j/, /g/, /ʃ/, /m/) and unaligned consonants (/p/, /t/, /c/, /k/, /s/, /t/); specifically in the third consonant are voiceless consonants.

In terms of the place of articulation, the KL consonant series is the majority of homorgan, namely (1) labial sound rows (/m-p/ and /m-b/), (2) alveolar sound rows (/n-t/, /n-d/, and /s-t/), (3) palatal sound rows (/ɲ-c/ dan /ɲ-ɟ/), and (4) velar sound rows (/ŋ-k/ dan /ŋ-g/). Each group of rows is called a homorganic sound because it is produced by the same place of articulation. Then, between the rows of consonants there are those that are in accordance with the articulation method, namely the rows of consonants /ʃ-s/ and the rows of consonants /ʃ-s/ which are both fricatives. In terms of sounding, there are consonant sequences that are [+sound]: nasal and oral (/m-b/, /n-d/, /p-ɟ/, /ŋ-g/), oral (fricative) and oral (inhibitory) (/ʃ-d/), oral (fricative) and nasal (/ʃ-m/) and some [-voice]: oral (fricative) and oral (inhibitory) (/s-k, s-t/). A series of KL consonants that are not in accordance with the place of articulation, means of articulation, and sounding, namely the series /ʔ-ʃ/ dan /ʔmp/.

Furthermore, among the sequenced consonants there are those who are both voiced and those who are both voiceless. The rows of consonants that are both voiced are the rows between the nasal and oral (/m-b/, /n-d/, /p-ɟ/, /ŋ-g/), the rows between the oral (fricative) and oral (inhibitory) (/ʃ-d/), and the rows between the oral (fricative) and nasal (/ʃ-m/); while the equally voiceless rows are the rows between the oral (fricative) and oral (inhibitory) (/s-k, s-t/).

### 3.3 Unique Vowel-Consonant Sequences in KL

Based on the structure of the root morpheme syllable, especially in the structure of VK-KV and VK-KVK, the code or consonant in the first syllable (VK) is unique because only homorganic nasal consonants can occupy that position.

ampung/ampung/	[ampung]	‘light’
umput /umput/	[ʊmpʊt>]	‘connect’
umbi /umbi/	[ʊmbi]	‘ubi’
imba /imba/	[ɪmba]	‘imitate’
antat /antat/	[antat>]	‘between’
undu /undu/	[ʊndu]	‘push’
unjun /unjun/	[ʊɲɲʊn]	‘thrust’
angkan /angkan/	[aŋkan]	‘assume’
engkas /əŋkas/	[əŋkas]	‘former’
angse /aŋsə/	[aŋsə]	‘goose’

This phenomenon suggests that the phonotactic rule of KL does not allow vowel sequences with other consonants, other than nasal consonants at that position, for example, between vowels and inhibitions as in Indonesian—oblong [əblɔŋ] ‘sleeveless and collarless shirt’ and oxytone [ək > sitən] ‘word pressurized at the end’. This shows the tendency that the next consonant that fills the onset function in the next tribe is assimilated with the previous consonant: the inhibitory consonants /b/ and /p/ that are assimilated with the nasal /m/, the inhibitory consonants /t/ and /d/ that are assimilated with the nasal /n/, the inhibitory consonants /ɟ/ that are assimilated with the nasal /ŋ/, and the inhibitory consonants /k/ that are assimilated with the nasal /ŋ/; while the consonants that are not assimilated with the previous consonant are the consonant /s/.

The non-assimilation of consonants /s/ is caused by the word *angse* /aŋsə/ [aŋsə] ‘goose’-- where the consonant /s/ is an absorption word through the process of changing the vowel at the end of the word, namely from the vowel /a/ in *goose* /aŋsa/ to the vowel /ə/ in [aŋsə]. The question that arises is why the consonant /s/ does not turn into a consonant /k/ because absorption usually adjusts to the phonotactic rules of absorbent language. Arguments that can be submitted are (1) KL has the vowel /s/ so that it does not conflict with the sound system KL; (2) when the change occurs so as to bring up the word /aŋkə/, while the word *angke*[aŋkə] ‘number’ itself already exists in KL; and (3) the speaker wants to show the ‘authenticity’ of the word.

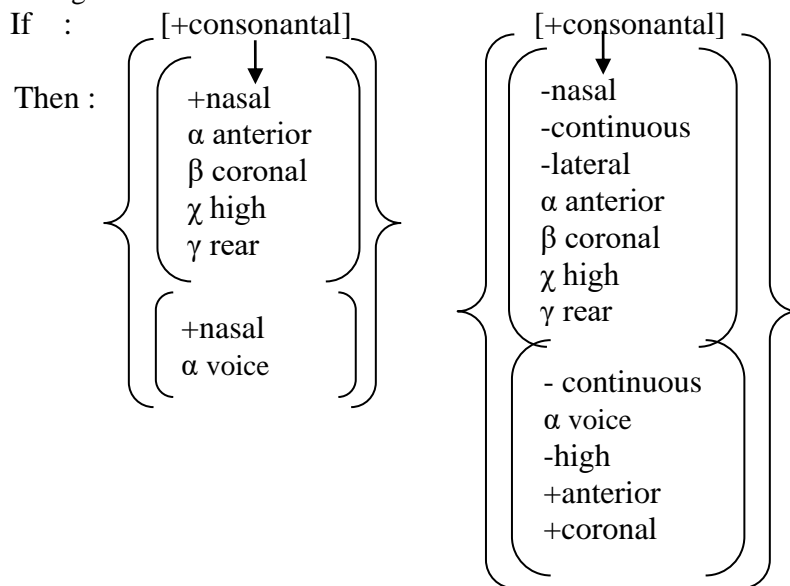
### 3.4 Requirements of If-Then Cluster and Consonant Series KL

The if-then requirement of this original segment includes the if-then requirement of a consonant sequence in the form of a cluster and the if-then requirement of a consonant sequence. These two things are presented in detail below.

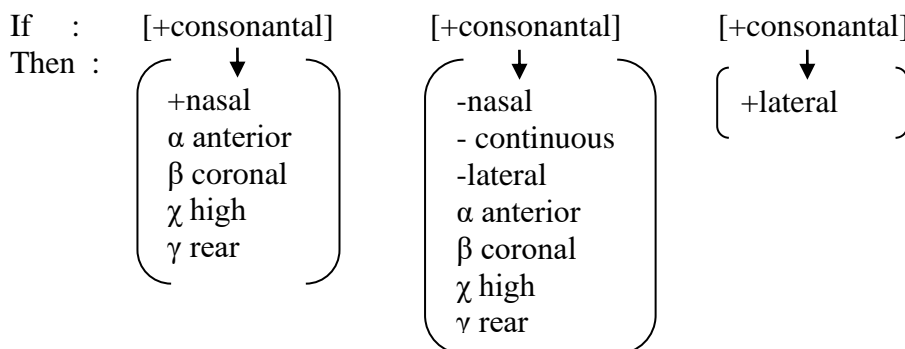
#### 3.4.1 Requirements if-then KL cluster

The KL cluster, as seen in table 1, requires three rule requirements if then, as seen below.

##### (1) Homorgan Cluster Rule

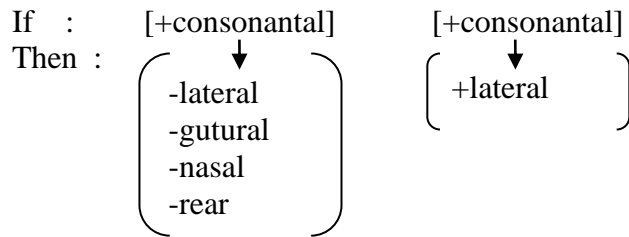


##### (2) Homorgan and Lateral Cluster Rule



##### (3) Inhibitory and Lateral Cluster Role





The above rules formulate that there is a regularity of consonant sequences in a syllable structure. Rule (1) states two things: (a) if the first consonant in the original segment cluster is nasal, it will be followed by a homorganic non-nasal consonant — which has harmony in terms of the place of articulation (+anterior, coronal, high, rear) so that if the nasal is [+anterior], then the second consonant is also [+anterior], vice versa if the nasal is [-anterior], then the second consonant is also [-anterior]; if the nasal is [+coronal], then the second consonant is also [+coronal], vice versa too; if the nasal is [+high], then the second consonant is also [+high], and vice versa; and if the nasal is [+rear], then the second consonant is also [+rear], and vice versa; (b) if the first consonant in the original segment cluster is [+continuous] and [-sound], then the second consonant is [-continuous] and [-sound].

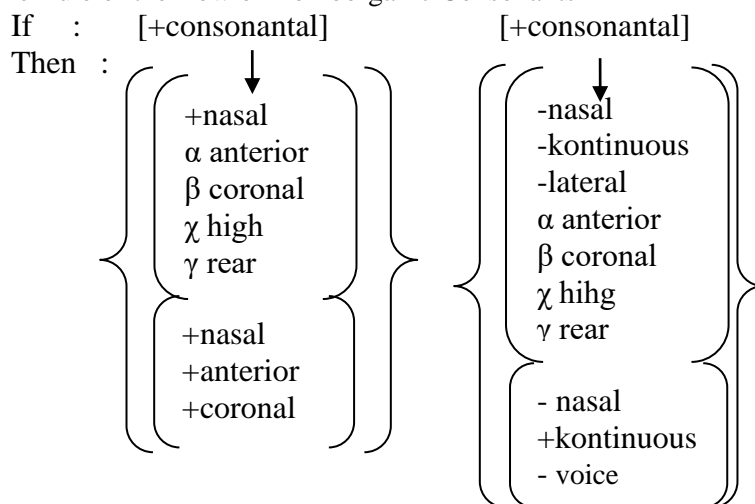
Rule (2) states that if the first consonant in the original segment cluster is a nasal, it will be followed by a second consonant not nasal that is homologous to the nasal sound and has harmony in terms of the place of articulation ([anterior, coronal, high, rear]), and also followed by a third consonant characterized by [+lateral]. Rule (3) states that if the first consonant in the origin segment cluster is [-lateral, -gutural,-nasal, -rear], then it will be followed by a second consonant which is [+lateral].

Rule (3) states that if the first consonant in the original segment cluster is [-lateral, -gutural, -nasal, -rear], then it will be followed by a second consonant that is [+lateral].

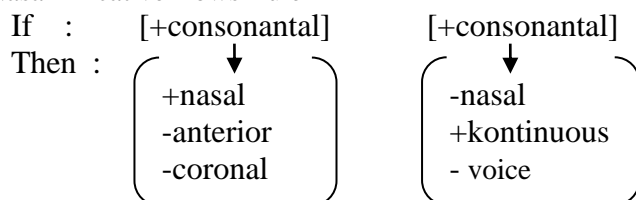
### 3.4.2 Requirements if-then row of consonants

The sequence of KL consonants is described in five if-then rules, as presented below.

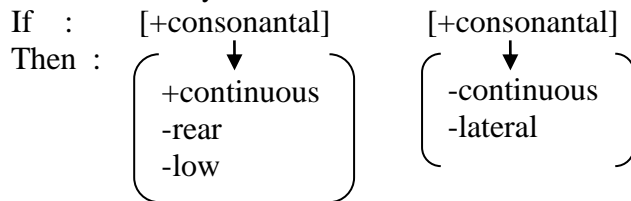
#### (1) The Rule of the Row of Homoorganic Consonants



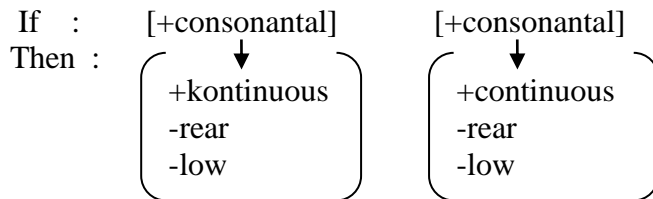
#### (2) Nasal-Fricative Rows Rule



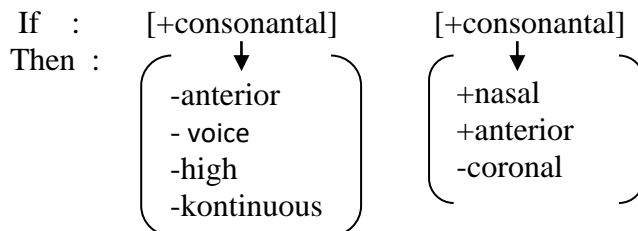
(3) Fricative-Inhibitory Rows Rule



(4) Fricative-Fricative Rows Rule



(5) Glotal-Nasal Rows Rule



The above rules formulate the order of consonant sequences in the original segment. The rule states that (a) if the first consonant is nasal then it is followed by a homorganic non-nasal consonant ([anterior, coronal, high, rear]); if the nasal is [+anterior], then the second consonant is also [+anterior], otherwise if the nasal is [-anterior], then the second consonant is [-anterior]; if the nasal is [+coronal], then the second consonant is also [+coronal], vice versa too; if the nasal is [+high], then the second consonant is also [+high], and vice versa; and if the nasal is [+rear], then the second consonant is also [+rear], and vice versa; (b) if the first consonant is in the origin segment cluster [+nasal, +anterior, +coronal], then the second consonant is [-nasal, +continuous, - voice]

Rule (2) states that if the first consonant in the sequence is [+nasal, -anterior, -coronal], then the second consonant is [-nasal, +continuous, -voice]. Rule (3) states that if the first consonant is [-continuous, -rear, -low], then the second consonant is [-continuous, -lateral]. Rule (4) states that if the first consonant is [-continuous, -rear, -low], then the second consonant is [-continuous, -rear, -low] as well. Finally, rule (5) states that if the first consonant is [-anterior, -voice, -high, -continuous], then the second consonant is [+nasal, +anterior, -coronal].

#### 4. Conclusion

KL has 14 clusters (/pl/, /bl/, /gl/, /mp/, /mb/, /nt/, /nd/, /st/, /ɲc/, /ɲj/, /ɲcl/, /ɲk/, /ɲg/, and /ɲgl/) which are related to 12 two-consonant clusters and 2 three-consonant clusters. The formation of this KL cluster is in the form of (1) bilabial/velar inhibitory consonants in combination with lateral /l/consonants, (2) alveolar fricative consonants in combination with alveolar /t/ homorganic inhibitory consonants, and (3) nasal consonants in combination with homorganic inhibitory consonants. The third consonant in cluster 3 is the lateral consonant/l/. All KL consonant clusters occupy the onset position. In the formation of this cluster, the series of sonorities, inserts, and dissipations become an important part. The KL consonant cluster is abstracted in three rules if-then, namely (a) the rule if-then the homorgancluster, (b) the rule if-then the homorgan and lateral cluster, and (c) the rule if-then the inhibitory and lateral cluster.

KL has 21 consonant series (mp, mb, nt, nd, ns,nc, nj, nk, ng, ns, ŋb, ŋt, ŋd, ŋc, ŋk, ŋs, sk, st, ʔm,ʔ-ŋ, ʔ-mp). Of the 21 consonant series, 7 consonants occupy the first series: (/ʔ/, /m/, /n/, /j/, /ŋ/, /s/, /ʃ/); 11 consonants occupy the second series (/p/, /b/, /t/, /d/, /c/, /j/, /k/, /g/, /s/, /ʃ/, /m/); and 1 consonant occupies the third series (/p/). Consonant /ʃ/ combines with 7 second consonants; consonants /n, j, s/ combined with three second consonants; the consonants /m/, /j/, and /ʔ/ combine with the two second consonants. The consonant /ʔ/ can be combined with the cluster /mp/ resulting in a row of three consonants. The KL consonant series is differentiated by (1) articulation means — the first consonant is a nasal consonant (/m/, /n/, /j/, /ŋ/), a fricative (/ʃ, s/), and an inhibitory (/ʔ/); the second consonant is an inhibitory consonant (/p, b, t, d, c, j, g/), a fricative consonant (/ʃ, s/), and a nasal consonant (/m/); the third consonant is an inhibitory consonant (/p/); (2) based on the place of articulation, the first consonant is a bilabial, alveolar, palatal, velar, faring, and glotal; the second consonant is a bilabial, alveolar, palatal, velar, and faring; and the third consonant is bilabial; by voice, the first consonant is a voiced consonant (/m/, /n/, /j/, /ŋ/, /ʃ/); the second consonant is voiced (/b/, /d/, /j/, /g/, /ʃ/, /m/) and voiceless (/p/, /t/, /c/, /k/, /s/, /t/); specifically on the third consonant is a voiceless consonant; (3) based on the place of articulation, generally the KL consonant series are homoorganic: labial sounds (/m-p/ and /m-b/), alveolar sounds (/n-t/, /n-d/, and /s-t/), palatal sounds (/j-c / and /j-j/), and (4) velar sounds (/ŋ-k/ and /ŋ-g/); In terms of vocalization, there are [+sound] consonant series: nasal and oral (/m-b/, /n-d/, /j-j/, /ŋ-g/), oral (fricative) and oral (inhibitory) (/ʃ-d/), oral (fricative) and nasal (/ʃ-m/) and there are also [-sounds]: oral (fricative) and oral (inhibitory) (/s-k, s-t/). One series of KL consonants that do not match the place of articulation, the manner of articulation, and the vocalization, namely the /ʔ-ʃ/ and /ʔmp/ series. The KL consonant series is abstracted in five if-then rules, namely the homoorganic consonant series, the nasal-fricative series, the fricative-inhibitory series, the glottal-nasal series, and the fricative-fricative series.

This study is very comprehensive because it is more explanatory so that the cluster phonotactic system and the KL consonant series are described more clearly. This study has not shown the phonotactic system diphthong and vocal series so that a comprehensive picture of the KL phonotactic system is obtained. For this reason, it is necessary to conduct an in-depth study and a comprehensive explanation of diphthongs and KL consonant series.

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